

**First published record of rodent predation by guira cuckoo in Brazil:
notes about vertebrate predation**
Primeiro registro publicado de predação de um roedor pelo anu-branco
no Brasil: nota sobre predação de vertebrados

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Abstract: Guira cuckoo (*Guira guira*) is a communal breeder bird species displaying a diversified diet. In this study, we report the first published predation event of a rodent by Guira cuckoo in Brazil. We searched for vertebrate predation by this bird species in Brazilian domains in the following databases: Google Scholar, SciELO, Scopus and Web of Science. We recorded the rodent predation event in a landscape composed of pasture and gallery forest in Campo Grande municipality, Mato Grosso do Sul, central-west Brazil. The predated rodent is a vesper mouse, *Calomys* sp. We found 19 vertebrate species predated by the Guira cuckoo, distributed in all Brazilian domains, within the orders: Anura (5 species), Passeriformes (1), Squamata (12), and Rodentia (1 - present study). Our result contributes to the natural history of the Guira cuckoo, and highlights that this cuckoo bird displays a generalist diet, feeding on a diversity of vertebrate species.

Keywords: Gênero *Calomys*. Diet. Cerrado. Cuculiformes. Squamata.

Resumo: O anu-branco (*Guira guira*) é uma espécie de ave de reprodução comunitária que apresenta dieta diversificada. Neste estudo, relatamos o primeiro evento de predação publicado de um roedor por anu-branco no Brasil. Buscamos dados sobre a predação de vertebrados por esta espécie de ave nos domínios brasileiros por meio das bases de dados Google Acadêmico, SciELO, Scopus e Web of Science. Registramos o evento de predação do roedor em uma paisagem composta por pastagem e mata de galeria no município de Campo Grande, estado de Mato Grosso do Sul, no Centro-Oeste do Brasil. O roedor predado é um rato-do-mato, *Calomys* sp. Encontramos 19 espécies de vertebrados predados pelo anu-branco, distribuídas em todos os domínios brasileiros, dentro das ordens: Anura (5 espécies), Passeriformes (1), Squamata (12) e Rodentia (1 - presente estudo). Nosso resultado contribui para a história natural do anu e destaca que este cuco apresenta dieta generalista, alimentando-se de uma diversidade de espécies de vertebrados.

Palavras-chave: Genus *Calomys*. Dieta. Cerrado. Cuculiformes. Squamata.

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The Guira cuckoo, *Guira guira* (Gmelin 1788) (Aves: Cuculidae), has a thin, long-tailed body with a great ability to run and jump through branches (Sick, 1997). This species occurs in a wide geographical range from east to south-central South America, including Argentina, Bolivia, Brazil, Paraguay and Uruguay, commonly observed in open landscapes and anthropogenic habitats (Sick, 1997; BirdLife International, 2019). Guira cuckoo is a social species, living in flocks, distancing to forage during the daylight, but emitting close-contact calls to coordinate movement (Davis, 1940). The gregarious habit of this species is complex and important for the group's foraging success (Fandiño-Mariño, 1981). The diet is diversified, with a broad trophic range, from invertebrates to small vertebrates (Repenning et al., 2009). Among vertebrate, reptiles are the most likely group to be predated by guira cuckoos (Smariotto et al., 2017). In this study, we report the first published predation event of a rodent by Guira cuckoo in Brazil and review data on vertebrate predation by *G. guira* in Brazilian domains.

Rodent predation event was recorded on 27 January 2018, at 12:20 h in a disturbed landscape of the Cerrado domain, represented by pastures near a gallery forests, in the municipality of Campo Grande, Mato Grosso do Sul, Brazil (20° 22' 33.9" S, 54° 40' 41.7" W, datum WGS 84), during an environmental impact study. We were observing a group composed of eight *G. guira* individuals when one individual attacked a small rodent, capturing and transporting it to a termite mound (Figure 1). We photographed the prey and identify as a vesper mouse of the genus *Calomys* Waterhouse, 1837 (Rodentia, Cricetidae), based on morphological characteristics, such as white short hairs behind the ears, and surface of the hind foot with hair white (Bonvicino et al., 2008; Figure 1). Additionally, we performed a literature search on vertebrate predation by *G. guira* in Scholar Google, SciELO, Scopus, and Web of Science databases, without a definite time scope. We used the combination of following words in our search: 'predação' or 'predation' or 'pirincho' AND with the words 'anu-branco' or '*Guira guira*' or 'Guira



Figure 1. A *Calomys* sp. individual predated by *Guira guira* in the state of Mato Grosso do Sul, central-west Brazil: A) the white short hairs behind the ears of the rodent; B) the entire body of the small rodent. Photos: G. V. Oliveira (2018).

cuckoo' AND 'Amazônia' or 'Amazon' or 'Mata Atlântica' or 'Atlantic Forest' or 'Caatinga' or 'Cerrado' or 'Savanna' or 'Pantanal' or 'Pampa'. For each predation event, we selected the domain in which the event occurred, species predated and its taxonomic order, decimal coordinate and reference (bibliographic source). These informations are important to better characterize the predation events.

We found 16 studies (first report 1993 and last report 2018) totaling 21 records comprising 19 vertebrate species predated by the Guira cuckoo, distributed in all Brazilian domains, within the orders: Anura (5 species), Passeriformes (1), Squamata (12), and Rodentia (1 - our record, Table 1, Figure 2).

Table 1. Vertebrate species predated by Guira cuckoo in Brazilian domains.

Domain	Prey	Order	Latitude	Longitude	Reference
Amazon	<i>Cnemidophorus lemniscatus</i> (Linnaeus, 1758)	Squamata	-1.78333	-48.75	Carvalho-Filho (2008)
	<i>Tropidurus oradicus</i> Rodrigues, 1987	Squamata	-1.78333	-48.75	Carvalho-Filho (2008)
Atlantic Forest	<i>Pseudis platensis</i> Gallardo, 1961	Anura	-22.5165	-53.2841	Landgraf-Filho et al. (2011)
	<i>Turdus leucomelas</i> Vieillot, 1818	Passeriformes	-27.5503	-53.5069	Fritsch et al. (2018)
	<i>Liolaemus lutzæ</i> Mertens, 1938	Squamata	-22.95	-43.8333	Rocha (1993)
	<i>Tropidurus torquatus</i> (Wie-Neuwied, 1820)	Squamata	-19.05	-39.9667	Koski and Merçon (2015)
Caatinga	<i>Dermatonotus muelleri</i> (Boettger, 1885)	Anura	-11.0014	-37.0576	Caldas et al. (2017)
	<i>Rinella granulosa</i> (Spix, 1824)	Anura	-3.7780	-38.4978	Mesquita (2009)
	<i>Ameivula ocellifera</i> (Spix, 1825)	Squamata	-6.13722	-36.7475	Gogliath et al. (2010)
	<i>Hemidactylus mabouia</i> (Moreau de Jonnés, 1818)	Squamata	-3.73972	-38.5725	Andrade et al. (2015)
	<i>Iguana iguana</i> (Linnaeus, 1758)	Squamata	-5.50417	-38.4428	Coutinho et al. (2014)
Cerrado	<i>Physalaemus cf. fuscumaculatus</i>	Anura	-18.972	-48.2864	Kokubum and Zacca (2003)
	<i>Scinax aff. fuscovarius</i>	Anura	-17.5981	-52.5844	Morais et al. (2013)
	<i>Calomys</i> sp.	Rodentia	-20.3761	-54.6781	This study
Pampa	<i>Erythrolamprus poecilogyrus</i> (Wied Neuwied, 1825)	Squamata	-31.8602	-52.8167	Abegg et al. (2015)
	<i>Leptodactylus latrans</i> (Steffen, 1815)	Squamata	-29.9969	-53.4986	Corrêa et al. (2013)
Pantanal	<i>Amphisbaena vermicularis</i> Wagler, 1824	Squamata	-16.7069	-56.48	Smaniotto et al. (2017)
	<i>Copeoglossum nigropunctatum</i> (Spix, 1825)	Squamata	-16.7069	-56.48	Smaniotto et al. (2017)
	<i>Iguana iguana</i> (Linnaeus, 1758)	Squamata	-16.7069	-56.48	Smaniotto et al. (2017)
	<i>Tropidurus torquatus</i> (Wie-Neuwied, 1820)	Squamata	-16.7069	-56.48	Smaniotto et al. (2017)
	<i>Pantodactylus parkeri</i> Ruibal, 1952	Squamata	-16.5	-56.7	Bernarde et al. (2016)

Three species of *Calomys* occur in Mato Grosso do Sul state, *C. callidus* (Thomas, 1916), *C. callosus* (Rengger, 1830), and *C. tener* (Winge, 1887) (Patton et al., 2015; Tomas et al., 2017). *Calomys callidus* was recorded in a central portion of the State, in Dois Irmãos do Buriti municipality (Cáceres et al., 2010), ~71 km of Campo Grande municipality. *Calomys callosus* is distributed through the central-western portions of the State, including Sidrolândia municipality (Patton et al., 2015), ~58 km of Campo Grande. *Calomys tener* occurs in a large portion of the Mato Grosso do Sul state (Patton et al., 2015). Thus, we preferred a conservative approach, identifying only at the genus level. *Calomys* comprise frugivorous/gramnivorous small rodent species, with terrestrial locomotor habit, and common in open areas

(Bonvicino et al., 2008; Paglia et al., 2012). We believe that the predation of small rodents by Guira cuckoos can be more common than shown here, but not reported because of the difficulty in identifying predated species.

Even though Guira cuckoo seems to prefer insects (Soave et al., 2008), studies reporting this species feeding on small vertebrates are common, mainly anurans (Kokubum & Zacca, 2003; Mesquita, 2009; Landgraf-Filho et al., 2011; Morais et al., 2013; Caldas et al., 2017) and reptiles (Corrêa et al., 2013; Bernarde et al., 2016; Smaniotto et al., 2017). An opportunistic predation record on a pale-breasted thrush *Turdus leucomelas* nestling was also reported (Fritsch et al., 2018). Thus, the Guira cuckoo presents a generalist food habit, feeding on those that are in greater availability in

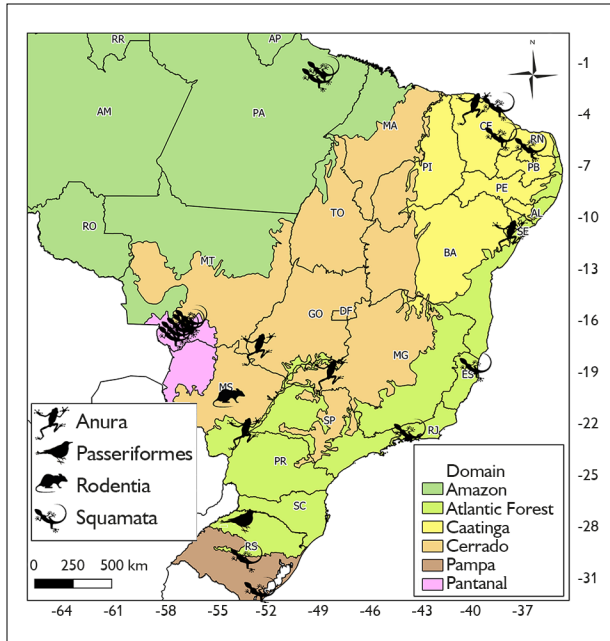


Figure 2. Brazil map showing the major domains and location of the events of predation of Anura, Passeriformes, Rodentia and Squamata by *Guira guira* (see Table 1 for detailed information about the predated species, geographical coordinates and literature cited). Map: W. Hannibal (2019).

the environment (Repenning et al., 2009). Therefore, we highlight that the predation of *Calomys* sp., as well as other rodents, may be more common than the literature reports. Our findings contribute to the natural history and dietary aspects of *Guira* cuckoos and Cuculidae in general, as well as enhances our knowledge of the food chain in Brazilian biomes.

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AUTHORS' CONTRIBUTIONS

S. R. Oliveira contributed to investigation, visualization and writing (original draft); W. Hannibal to supervision, formal analysis, data curation and writing (original draft, review and editing); J. E. S. Miranda to methodology, visualization and writing (original draft); and G. V. Oliveira to methodology, visualization and writing (original draft).

